

NONROAD ENGINE FAMILY BOXES

The engine family boxes shown below represent groupings of engine families with similar characteristics (i.e., the emissions standards that the engines were built to) for current and past model years. The boxes were grouped by the rated power categories and effective model years (for the emission standards). The number of engine families for each box were tabulated from an EPA engine certification database. All emission standards are in units of g/kW-hr.

These boxes serve as a guide to retrofit technology manufacturers who are interested in maximizing the number of engine families the retrofit device can be applied to, while minimizing the number of tests to demonstrate applicability. EPA/OTAQ staff shall determine the applicability of the retrofit device to the number of engine families on a case-by-case basis.

NR1 **kW<8**

MY 2000-2004	
TIER 1	
CO:	8.0
HC+NOx:	10.5
PM:	1.0
No. Of Families:	

MY 2005 - Present	
TIER 2	
CO:	8.0
HC+NOx:	7.5
PM:	0.80
No. Of Families:	

Pre MY 2000*	
No. Of Families:	

NR2 **8 ≤ kW < 19**

MY 2000-2004	
TIER 1	
CO:	6.6
HC+NOx:	9.5
PM:	0.80
No. Of Families:	

MY 2005 - Present	
TIER 2	
CO:	6.6
HC+NOx:	7.5
PM:	0.80
No. Of Families:	

Pre MY 2000*	
No. Of Families:	

NR3

19 ≤ kW < 37

MY 1999-2003	
TIER 1	
CO:	5.5
HC+NOx:	9.5
PM:	0.8
No. Of Families:	

MY 2004 - Present	
TIER 2	
CO:	5.5
HC + NOx:	7.5
PM:	0.6
No. Of Families:	

Pre MY 1999*	
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NR4

37 ≤ kW < 75

MY 1998-2003	
TIER 1	
NOx	9.2
CO:	-
HC+NOx:	-
PM:	-
	-
No. Of Families:	

MY 2004 - 2007	
TIER 2	
CO:	5.0
HC + NOx:	7.5
PM:	0.40
No. Of Families:	

MY 2008 - Present	
TIER 3	
CO:	5.0
HC + NOx:	4.7
PM:	0.40
No. Of Families:	

Pre MY 1998*	
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NR5

75 ≤ kW < 130

MY 1997-2002	
TIER 1	
NOx	9.2
CO:	-
HC+NOx:	-
PM:	-
	-
No. Of Families:	

MY 2003 - 2006	
TIER 2	
CO:	5.0
HC + NOx:	6.6
PM:	0.30
No. Of Families:	

MY 2007 - Present	
TIER 3	
CO:	5.0
HC + NOx:	4.0
PM:	0.30
No. Of Families:	

Pre MY 1997*	
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NR6**130 ≤ kW < 225**

MY 1996-2002	
TIER 1	
NOx	9.2
CO:	11.4
HC+NOx:	-
PM:	0.54
HC	1.3
No. Of Families:	

MY 2003 - 2005	
TIER 2	
CO:	3.5
HC + NOx:	6.6
PM:	0.20
No. Of Families:	

MY 2006 - Present	
TIER 3	
CO:	3.5
HC + NOx:	4.0
PM:	0.20
No. Of Families:	

Pre MY 1996*	

NR7**225 ≤ kW < 450**

MY 1996-2000	
TIER 1	
NOx	9.2
CO:	11.4
HC+NOx:	-
PM:	0.54
HC	1.3
No. Of Families:	

MY 2001 - 2005	
TIER 2	
CO:	3.5
HC + NOx:	6.4
PM:	0.20
No. Of Families:	

MY 2006 - Present	
TIER 3	
CO:	3.5
HC + NOx:	4.0
PM:	0.20
No. Of Families:	

Pre MY 1996*	

NR8**450 ≤ kW < 560**

MY 1996-2001	
TIER 1	
NOx	9.2
CO:	11.4
HC+NOx:	-
PM:	0.54
HC	1.3
No. Of Families:	

MY 2002 - 2005	
TIER 2	
CO:	3.5
HC + NOx:	6.4
PM:	0.20
No. Of Families:	

MY 2006 - Present	
TIER 3	
CO:	3.5
HC + NOx:	4.0
PM:	0.20
No. Of Families:	

Pre MY 1996*	

NR9

kW > 560

MY 2000 - 2005	
TIER 1	
NOx	9.2
CO:	11.4
HC+NOx:	-
PM:	0.54
HC	1.3
No. Of Families:	

MY 2006 - Present	
TIER 2	
NOx	-
CO:	3.5
HC + NOx:	6.4
PM:	0.20
HC	-
No. Of Families:	

Pre MY 1996*	
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POWER
EQUIVALENTS:

kW	hp
8	10.7
19	25.5
37	49.6
75	100.5
130	174.2
225	301.5
450	603
560	750.4

NOTE:

* Although emission standards did not exist for pre regulated engine families, emission standard predictions can be sought with nonroad modeling software. EPA/OTAQ staff shall discuss with the retrofit manufacturer to determine the applicability of the retrofit device to non-regulated engine families also on a case-by-case basis.